

EAST Search History

PHS

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L17	231	239/464.CCLS.	US-PGPU B; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2007/04/30 03:33

EAST Search History

JFS

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	893	(239/472.CCLS. OR 239/487.CCLS. OR 239/488.CCLS.)	US-PGPU B; USPAT; USOCR; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 02:23
L2	167	(239/472.CCLS. OR 239/487.CCLS. OR 239/488.CCLS.) AND (WASH\$4 OR CLEAN\$4 OR "134"/\$.CCLS.)	US-PGPU B; USPAT; USOCR; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 02:25
L5	291	(239/472.CCLS. OR 239/487.CCLS. OR 239/488.CCLS.) AND (VORTEX\$4 OR HELICAL\$4 OR SPIRAL\$4)	US-PGPU B; USPAT; USOCR; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 02:32
L11	122	"134"/\$.CCLS. AND ((VORTEX\$4 OR HELICAL\$4 OR SPIRAL\$4 OR SWIRL\$4 OR TORNADO OR WHIRL\$4) NEAR6 (PATTERN OR STREAM OR SPRAY OR SHAPE) NEAR6 (NOZZLE OR JET OR SHOWER OR SPRAYER))	US-PGPU B; USPAT; USOCR; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 02:57



US005975098A

United States Patent

[19]

Yoshitani et al.

[11] Patent Number: **5,975,098**[45] Date of Patent: **Nov. 2, 1999**[54] APPARATUS FOR AND METHOD OF
CLEANING SUBSTRATE

[75] Inventors: Mitsuaki Yoshitani; Kazuo Kinose;
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[73] Assignees: Dainippon Screen Mfg. Co., Ltd.;
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[21] Appl. No.: 08/775,712

[22] Filed: Dec. 17, 1996

[30] Foreign Application Priority Data

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Dec. 21, 1995 [JP] Japan 7-333121

[51] Int. Cl.⁶ B08B 3/02[52] U.S. Cl. 134/148; 134/153; 134/181;
134/198; 134/902; 134/184[58] Field of Search 134/148, 153,
134/902, 172, 181, 184, 198; 239/102.2

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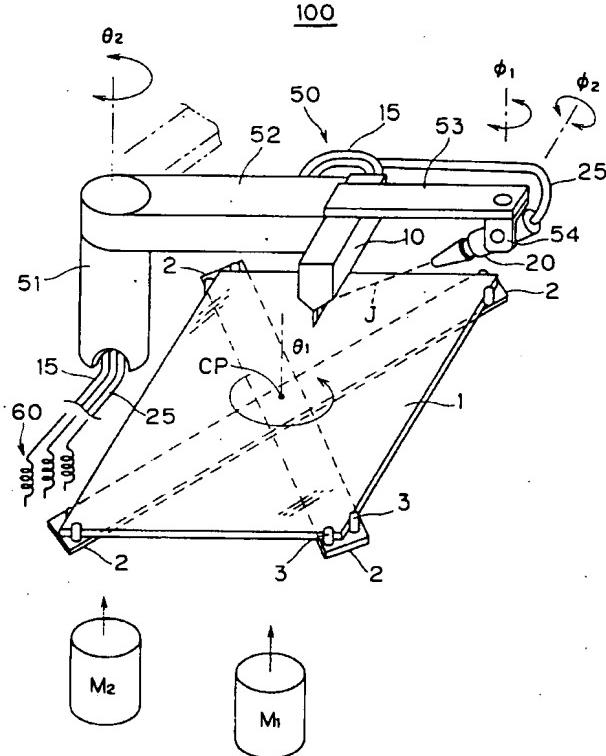
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[57] ABSTRACT

A substrate rinsing apparatus of a non-contact type having a high rinsing ability. An ultrasonic rinsing nozzle and a high-pressure rinsing nozzle are both disposed within the same rinsing apparatus. The ultrasonic rinsing nozzle ejects ultrasonic rinsing liquid as a curtain through a slit, while the high-pressure rinsing nozzle ejects a high-pressure rinsing jet toward the ultrasonic rinsing liquid which is ejected toward a substrate. Not only is foreign matter removed by ultrasonic rinsing, but foregoing matter is removed by the high-pressure rinsing jet and is carried away by a flow of the ultrasonic rinsing liquid and washed off the substrate toward a downstream side of rotation of the substrate.

27 Claims, 23 Drawing Sheets



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L13	832	134/123.CCLS.	US-PGPU B; USPAT; USOCR; FPRS; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 03:15
L14	1316	134/198.CCLS.	US-PGPU B; USPAT; USOCR; FPRS; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 03:15
L16	45	((CAR OR VEHICLE OR TRUCK OR AUTO OR AUTOMOBILE) NEAR5 (WASHING OR WASH OR CLEAN\$4)) AND ((VORTEX\$4 OR HELICAL\$4 OR SPIRAL\$4 OR SWIRL\$4 OR TORNADO) NEAR6 (PATTERN OR STREAM OR SPRAY OR SHAPE) NEAR6 (NOZZLE OR JET OR SHOWER OR SPRAYER))	US-PGPU B; USPAT; USOCR; EPO; JPO; DERWEN T; IBM_TDB	OR	ON	2007/04/30 03:23